

AMENDMENTS TO THE CLAIMS

The listing of claims below replaces all prior versions of claims in the application.

1. (Currently Amended): A method of catalytic reaction using a micro-reactor, characterized in that:

said method of catalytic reaction uses a micro-reactor with a metal catalyst or a metal complex catalyst as a solid phase supported on an inner wall of a channel, characterized in that

said metal catalyst or said metal complex catalyst is a catalyst incorporated in a polymer, said catalyst incorporated in a polymer is supported on the inner wall of said channel by covalent bond to a group provided on the inner wall of said channel or said catalyst incorporated in a polymer is supported on the inner wall of said channel by covalent bond via a spacer bonded to a group of the polymer surface,

said group provided on the inner wall of said channel is an amino group, and
said amino group is covalent bonded with said group of said polymer surface or said
spacer,

a gas as a gas phase is passed at the center part of the channel,
a solution as a liquid phase in which a reactant is dissolved is passed between said gas and said catalyst supported on the inner wall of said channel,

thereby the reaction of said solution and said gas is conducted by the three phase catalytic reaction of solid – liquid – gas phases accelerated by said metal catalyst or said metal complex catalyst.

2. (Cancelled)

3. (Previously Presented): The method of catalytic reaction using a micro-reactor as set forth in claim 1, characterized in that said metal catalyst is palladium.

4. (Previously Presented): The method of catalytic reaction using a micro-reactor as set forth in claim 1, characterized in that said metal catalyst is either one of chromium, manganese, iron, cobalt, nickel, copper, molybdenum, ruthenium, rhodium, tungsten, osmium, iridium, and palladium.

5. (Previously Presented): The method of catalytic reaction using a micro-reactor as set forth in claim 1, characterized in that said metal complex catalyst is a palladium complex catalyst.

6. (Previously Presented): The method of catalytic reaction using a micro-reactor as set forth in claim 1, characterized in that said metal complex catalyst is a metal complex catalyst of either one of chromium, manganese, iron, cobalt, nickel, copper, molybdenum, ruthenium, rhodium, tungsten, osmium, iridium, and palladium.

7. (Original): The method of catalytic reaction using a micro-reactor as set forth in claim 1, characterized in that said gas phase consists of hydrogen or carbon monoxide.

8. (Currently Amended): A method of catalytic reaction using a micro-reactor, characterized in that:

said method of catalytic reaction uses a micro-reactor with a metal catalyst or a metal complex catalyst as a solid phase supported on an inner wall of a channel, characterized in that

said metal catalyst or said metal complex catalyst is a catalyst incorporated in a polymer,

said catalyst incorporated in a polymer is supported on the inner wall of said channel by covalent bond to a group provided on the inner wall of said channel or said catalyst incorporated in a polymer is supported on the inner wall of said channel by covalent bond via a spacer bonded to a group of the polymer surface,

said group provided on the inner wall of said channel is an amino group, and

said amino group is covalent bonded with acid group of said polymer surface or said spacer,

hydrogen as a gas phase is passed at the center part of the channel,

a solution as a liquid phase in which a reactant is dissolved is passed between said hydrogen and said catalyst supported on the inner wall of said channel,

thereby the reaction of said solution and said hydrogen is conducted by the three phase catalytic reaction of solid – liquid – gas phases accelerated by said metal catalyst or said metal complex catalyst.

9. (Cancelled)

10. (Previously Presented): The method of catalytic reaction using a micro-reactor as set forth in claim 8, characterized in that said metal catalyst is palladium.

11. (Previously Presented): The method of catalytic reaction using a micro-reactor as set forth in claim 8, characterized in that said metal catalyst is either one of chromium, manganese, iron, cobalt, nickel, copper, molybdenum, ruthenium, rhodium, tungsten, osmium, iridium, and palladium.

12. (Previously Presented): The method of catalytic reaction using a micro-reactor as set forth in claim 8, characterized in that said metal complex catalyst is a palladium complex catalyst.

13. (Previously Presented): The method of catalytic reaction using a micro-reactor as set forth in claim 8, characterized in that said metal complex catalyst is a metal complex catalyst of either one of chromium, manganese, iron, cobalt, nickel, copper, molybdenum, ruthenium, rhodium, tungsten, osmium, iridium, and palladium.

14. (Currently Amended): ~~[[The]]~~ A method of catalytic reaction using a micro-reactor ~~as set forth in claim 1,~~ characterized in that:

said method of catalytic reaction uses a micro-reactor with a metal catalyst or a metal complex catalyst as a solid phase supported on an inner wall of a channel, characterized in that
said metal catalyst or said metal complex catalyst is a catalyst incorporated in a polymer,

said catalyst incorporated in a polymer is supported on the inner wall of said channel by covalent bond via a spacer bonded to a group of the polymer surface,

[[the]] said surface of the inner wall of said channel has silanol groups, and said spacer is covalent bonded with said silanol group by Si–O–Si bond;

a gas as a gas phase is passed at the center part of the channel,

a solution as a liquid phase in which a reactant is dissolved is passed between said gas and said catalyst supported on the inner wall of said channel,

thereby the reaction of said solution and said gas is conducted by the three phase catalytic reaction of solid – liquid – gas phases accelerated by said metal catalyst or said metal complex catalyst.

15. (Currently Amended): The method of catalytic reaction using a micro-reactor as set forth in claim [[1]] 14, characterized in that the group on said polymer surface is an epoxide group, and the group in said spacer is modified with a functional group bondable with an epoxide group.

16. (Currently Amended): [[The]] A method of catalytic reaction using a micro-reactor ~~as set forth in claim 8,~~ characterized in that:

said method of catalytic reaction uses a micro-reactor with a metal catalyst or a metal complex catalyst as a solid phase supported on an inner wall of a channel, characterized in that

said metal catalyst or said metal complex catalyst is a catalyst incorporated in a polymer,

said catalyst incorporated in a polymer is supported on the inner wall of said channel by covalent bond via a spacer bond to a group of the polymer surface.

[[the]] said surface of the inner wall of said channel has silanol groups, and said spacer is covalent bonded with said silanol group by Si–O–Si bond;

hydrogen as a gas phase is passed at the center part of the channel,

a solution as a liquid phase in which a reactant is dissolved is passed between said hydrogen and said catalyst supported on the inner wall of said channel,

thereby the reaction of said solution and said hydrogen is conducted by the three phase catalytic reaction of solid – liquid – gas phases accelerated by said metal catalyst or said metal complex catalyst.

17. (Currently Amended): The method of catalytic reaction using a micro-reactor as set forth in claim [[8]] 16, characterized in that the group on said polymer surface is an epoxide group, and the group in said spacer is modified with a functional group bondable with an epoxide group.

18. (New): The method of catalytic reaction using a micro-reactor as set forth in claim 14, characterized in that said metal catalyst is either one of chromium, manganese, iron, cobalt, nickel, copper, molybdenum, ruthenium, rhodium, tungsten, osmium, iridium, and palladium.

19. (New): The method of catalytic reaction using a micro-reactor as set forth in claim 14, characterized in that said metal complex catalyst is a metal complex catalyst of either one of chromium, manganese, iron, cobalt, nickel, copper, molybdenum, ruthenium, rhodium, tungsten, osmium, iridium, and palladium.

20. (New): The method of catalytic reaction using a micro-reactor as set forth in claim 14, characterized in that said gas phase consists of hydrogen or carbon monoxide.

21. (New): The method of catalytic reaction using a micro-reactor set forth in claim 16, characterized in that said metal catalyst is either one of chromium, manganese, iron, cobalt, nickel, copper, molybdenum, ruthenium, rhodium, tungsten, osmium, iridium, and palladium.

22. (New): The method of catalytic reaction using a micro-reactor as set forth in claim 16, characterized in that said metal complex catalyst is a metal complex catalyst of either one of chromium, manganese, iron, cobalt, nickel, copper, molybdenum, ruthenium, rhodium, tungsten, osmium, iridium, and palladium.